ULTRA REVERSE OSMOSIS SYSTEM

APEC WATER SYSTEMS

INSTALLATION INSTRUCTION

Free Drinking Water .com

Please keep this Owner's Manual for future reference.

It contains useful information on how to maintain and care for your APEC Reverse Osmosis water filter system.

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Thank you for choosing APEC reverse osmosis sytems.
You now own the finest water filter in America.

Please read and become familiar with instructions and parts needed before proceeding with the installation.

BEFORE INSTALLATION:

Inspect the system:

Please take the system and all the components out of the box. Inspect the system and all the connection fittings carefully, make sure nothing is damaged during shipping. If any part is cracked or broken, please do not proceed with the installation and contact APEC or your distributor for an exchange or diagnosis.

Recommended tools list:

- Variable speed drill
- Drill bit: ¼" (for the waste line), 1/8" (as pilot, not mandatory), and ½" (for standard faucet hole, air-gap faucet requires 1&1/4" hole)
- 5/8", 9/16" open-end wrench, or adjustable wrench, pliers
- Phillips screwdriver
- Utility knife, or scissors
- Teflon tape

Operating Parameter

- Operating pressure: 100psi maximum
- Feed water temperature: 40 – 100 degree F (4-37 degree C)
- **Do not** connect this unit to **hot** water source
- Install the RO in a sheltered environment, avoid exposure to hot and cold weather or under direct sun light.

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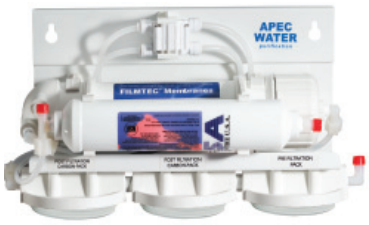
Components included with the RO system:

Make sure you have all these parts before starting installation.



1 RO system head

3 Pre-filters in 3 Housings

1 Storage tank

1 RO Membrane

Installation kit includes:

1 Faucet with
washers and nuts

1 Feed water adaptor 1/2"
with needle valve kit

1 Drain saddle for waste water

3 Color tubing 1/4"

1 tank's ball valve

1 Wrench
for opening housing

3 pairs Plastic nuts
and inserts
for standard systems
(1 pair for quick-connect models)

Component Itemization:

1) Bracket
2) Membrane and housing (4th-stage filter)
3) In-line carbon filter (5th-stage filter)
4) Sediment pre-filter and housing (1st-stage filter)
5) Carbon block pre-filter and housing (2nd-stage filter)
6) Carbon block pre-filter and housing (3rd-stage filter)
7) Storage tank
8) Tank ball valve
9) ASO – Automatic Shut Off valve
10) Check valve (Internal check valve encased in plastic fitting)
11) T-fitting
12) Feed water inlet
13) Product (filtered) water outlet

THERE ARE THREE PARTS TO INSTALLING THE RO SYSTEM:

Part I. Assemble the filters and housings onto the main system
Part II. Placing the Membrane into the membrane housing
Part III. Installing the system

PART I. ASSEMBLE THE FILTERS AND HOUSINGS ONTO THE MAIN SYSTEM

Remove plastic/paper wrappings on the 3 filters, put them into the 3 housings, and assemble the housings onto the main system as follow:

Fig. 1 Stand the 3 housings upright. Make sure each housing has a rubber O-ring in its groove.
Put the "Puretrex 5 micron" sediment filter into the "1st stage" housing on the right.
Put the "Matrikx +CTO" carbon filter into the "2nd stage" housing in the middle.
Put the "Matrikx +CTO" carbon filter into the "3rd stage" housing on the left.

Fig. 2 Starting from the 3rd stage housing on the left, hand twist the housing onto the main system turning counterclockwise, one by one, for all 3 housings.

Fig. 3 Use the wrench provided to completely tighten the housing starting from 1st-stage. Repeat this step for the 2nd stage housing in the middle, and for the 3rd stage housing on right.

Note: For some people it is easier to use the wrench with the system laid down (face up).

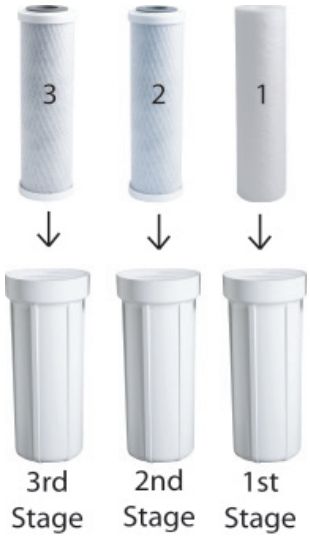


Fig. 1

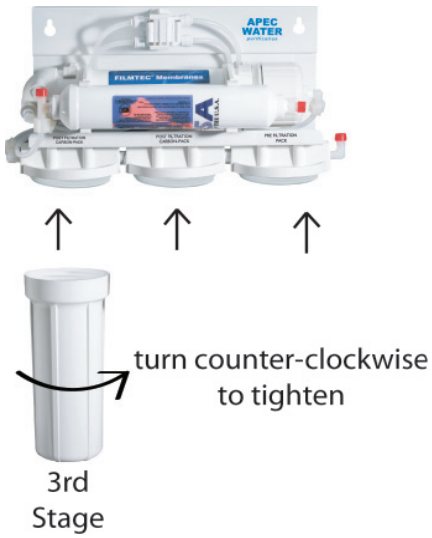


Fig. 2

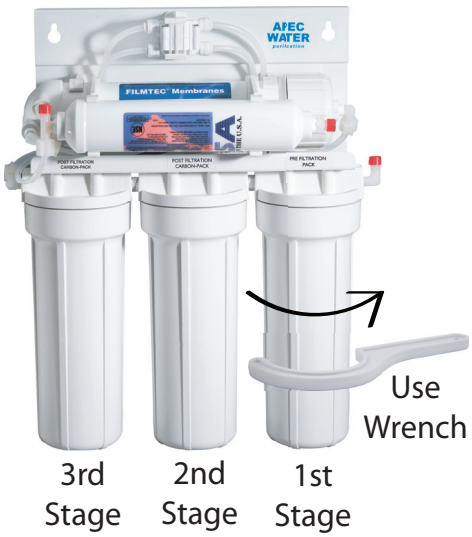


Fig. 3

PART II. PLACING THE MEMBRANE INTO THE MEMBRANE HOUSING

This system has been wet tested in the factory, and the RO membrane is sealed to preserve freshness.

1. Locate the blue membrane and remove it from the plastic bag.
2. Locate the Membrane Housing (labelled "Membrane") on the system.
3. **Fig. 4A**
   1. Disconnect the RED tubing from the membrane housing's cap. Do so by unscrewing the plastic nut on the fitting.
   2. Remove the membrane housing cap (turn counterclockwise).
   3. See **Fig 4B**. Insert membrane all the way into the housing tightly with the correct side going in first as shown below.

Note: Make sure the membrane is inserted in the correct way as shown in Fig 4B!

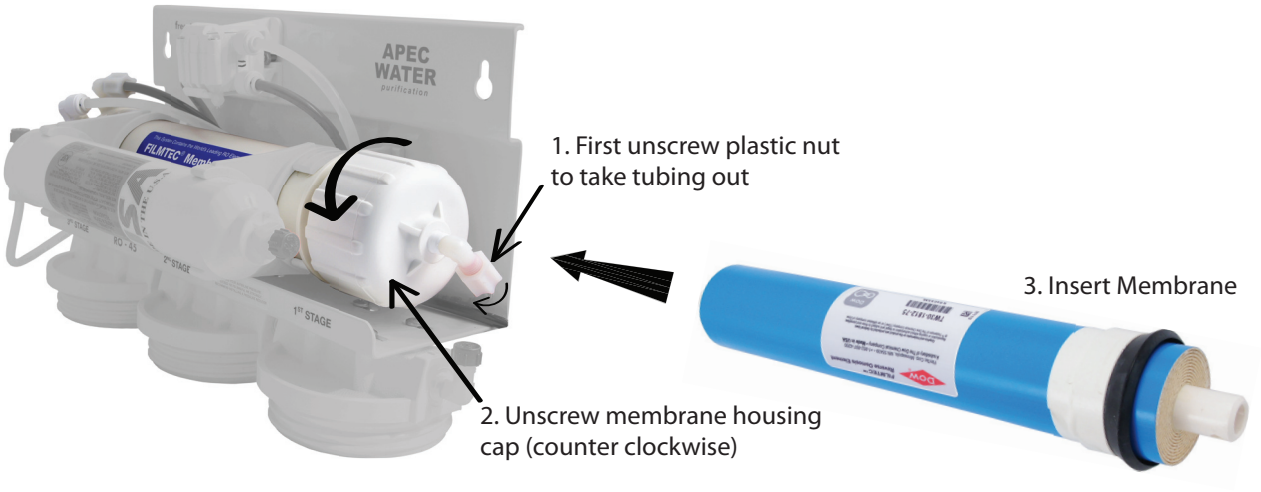

APEC WATER
1. First unscrew plastic nut to take tubing out
3. Insert Membrane
2. Unscrew membrane housing cap (counter clockwise)

Fig. 4A

Fig. 4B

(Follow these same procedures for future membrane changing and maintenance.)

4. Close the cap of the housing and reconnect tubing as before.

PART III. INSTALLING THE SYSTEM

Space: Make sure there is sufficient space under the counter for installation (an area of about **12"Lx6"Wx18"H** for the system, **11"diam x18"H** for tank).

The RO system is best installed under the kitchen sink. But if that is not feasible you can install the system anywhere where there is a cold water supply with sufficient water pressure for the chosen RO model, and an outlet to drain off the waste water from the system.

Mounting: No need to mount the RO system on the wall. The RO system can stand in the sink cabinet without mounting, this makes future filter change easy and convenient. If you prefer to mount the system to the wall, please make sure it can be taken down easily for filter replacement.

Step 1: Feed Water Connection

See Fig. 5D: The RO system must be connected to the COLD water supply only!

1. Locate the **Cold** water supply valve under the kitchen sink (the round or oblong handle on the right side). Turn off the incoming cold water completely by turning the shut off handle clockwise.

   Note: If the cold water shut off valve can not turn off the water, the main water supply to the house must be shut off for the installation. Another option is to use a "self piercing saddle valve" from APEC or from a local hardware store.

2. **Feed Water Adaptor (1/2"):** See **Fig. 5.** The Feed Water Adaptor comes with a separate Needle Valve. The Adaptor goes inline onto your 1/2" cold water pipe. The Needle Valve portion screws onto the Adaptor as shown in **Fig. 5.**

   The "cone-shaped" washer provided is optional. If your pipe already has a built-in cone washer, then no need to use this one.

3. **For Flex Line Riser:** See **Fig. 5A.** Loosen nut and separate cold water riser tube from faucet shank. Gently bend riser tube so that the Feed Water Adapter (Fig 5) fits onto the faucet shank. If your riser tube has no built-in washer, then fit the cone-shaped washer provided onto the riser tube. Connect the riser tube, the feed water adapter, and faucet shank together and **tighten**.

   For Solid Copper Riser: See **Fig. 5B.** Follow the same procedure as for flex line. If the copper riser cannot bend, then it's best to replace it with a flex line riser. Then fit the feed water adaptor the same way as described above.

Fig. 5

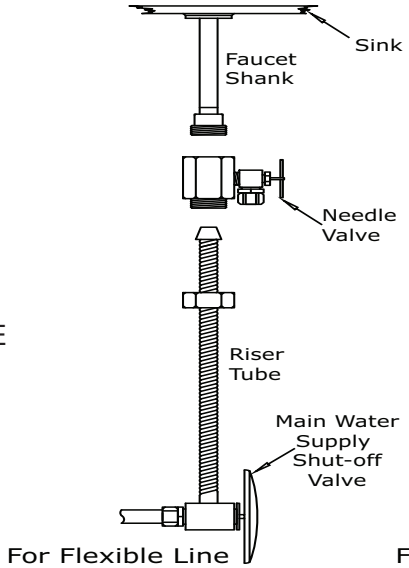


Fig. 5A

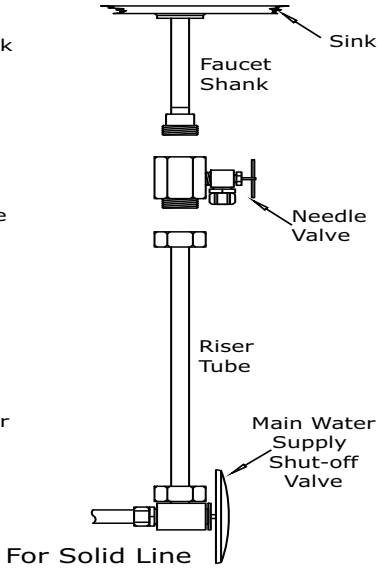


Fig. 5B

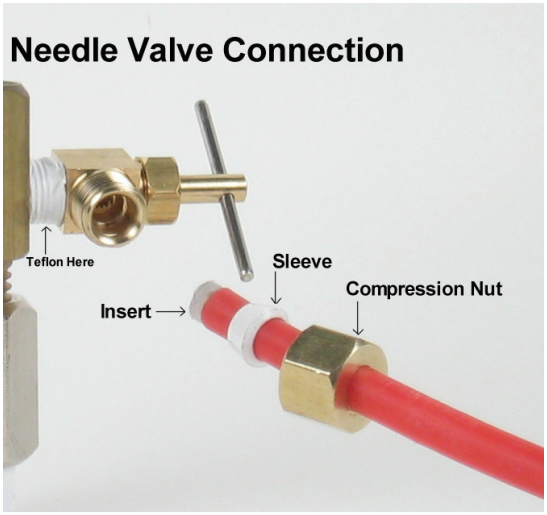


Fig. 5C

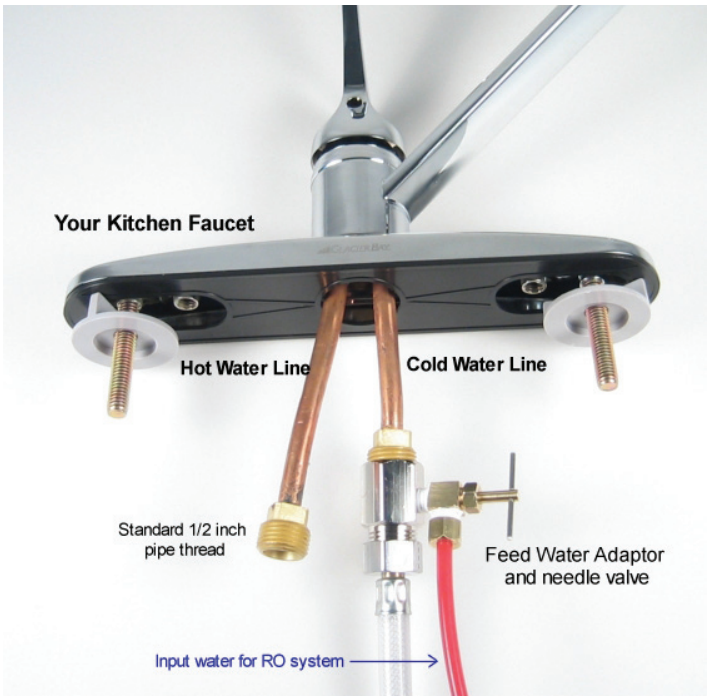

Your Kitchen Faucet
Hot Water Line
Cold Water Line
Standard 1/2 inch pipe thread
Feed Water Adaptor and needle valve
Input water for RO system

Fig. 5D

4. **Needle Valve:** See **Fig. 5C**. Screw the Needle Valve onto the Adapter tightly. Apply 3-4 rounds of Teflon tap onto Needle Valve before attaching it to the Adaptor.

To **open** needle valve: Turn needle handle counter-clockwise.
To **close** needle valve: Turn needle handle clockwise.

Test for leaks at this point: Close the Needle Valve (turn needle handle **clockwise** all the way in to close) Turn ON the cold water supply to the sink faucet. If the Needle Valve or the Adaptor leaks, check the connection and try applying more Teflon tape or tighten the brass nut some more to stop the leak.

Step 2: Drain Saddle Installation

Note: To avoid annoying drainage noise, mount drain line as low as possible on the vertical tailpiece, or on horizontal tailpiece.

There is constant water pressure "packed" inside the RO system which blocks the waste water from backing-up into the system. So the waste water is "forced-drained", not "gravity-drained".

1. **See Fig. 6.** The drain saddle assembly should be installed above the trap and on the vertical or horizontal tailpiece . To reduce the drainage noise, mount the drain line as low as possible above the trap, or on the horizontal tailpiece.

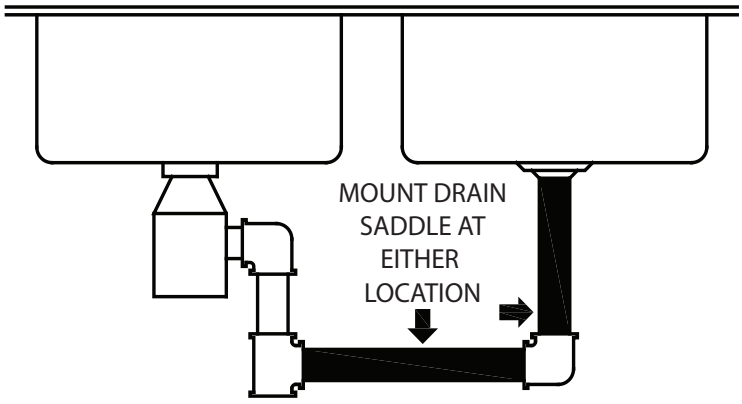


Fig. 6

2. See **Fig.7**. Mark the position of the hole on the drain pipe and drill a 1/4'' hole through one side of the drain pipe . There is a piece of self-adhesive sponge provided. Glue this sponge to the inside of the saddle, this will cushion any gap between the saddle and the pipe. Make sure the hole on the sponge is thoroughly punched out, and is aligned to the hole on the saddle.

Fig.7

Fig.8

3. See Fig. 8, 8A. <u>Make sure to align the drain saddle hole to the drilled hole perfectly</u>. Mis-aligning these two holes will block the waste water and cause membrane damage. Attach the drain saddle to the drain pipe and tighten the two screws evenly.

Fig.8A

Step 3: Drill A Hole For The RO Faucet

Drill 1/2" diameter hole for standard RO faucet. (Air-Gap faucet: drill 1&1/4" hole.)

For best results use a ½" carbide-tipped masonry drill bit.

Wear safety glasses to protect your eyes while drilling the faucet hole.

Note: <u>No need to drill a hole if an existing hole is available:</u>

a) **Spare hole**: If there is a spare hole in the sink covered by a chrome cover, simply remove the chrome cover and install the RO faucet there.

b) **Spray hose**: If the spray hose is not in use, remove the hose, and mount the RO faucet there. Remember to plug up the outlet under the main faucet. If the spray hose uses a diverter at the base of the spout, be sure to remove it to avoid trouble later on.

c) **Hanging faucet**: If drilling a hole is not feasible (i.e. rental home, drill tool not available etc.), the faucet can just on the cabinet door or wherever that is convenient. Be creative!

When drilling a hole for the RO faucet, choose a location that looks good, works well, and is most convenient for dispensing pure water. An ample flat area is required for the faucet base so that the faucet can be drawn down tightly.

1. ***Faucet location:*** Make sure the faucet stud will be accessible from below when the hole is drilled. If space is not available on the upper sink area, the faucet can be located on the counter top by the edge of the sink. If the counter top is ceramic tile, the method for drilling the hole will be the same as for porcelain sinks.

2. ***For Stainless Steel Sink:*** Before using a 1/2" carbide drill bit, an indent should be made with a center punch to keep the drill bit from walking. A small pilot hole will also aid the drill bit.

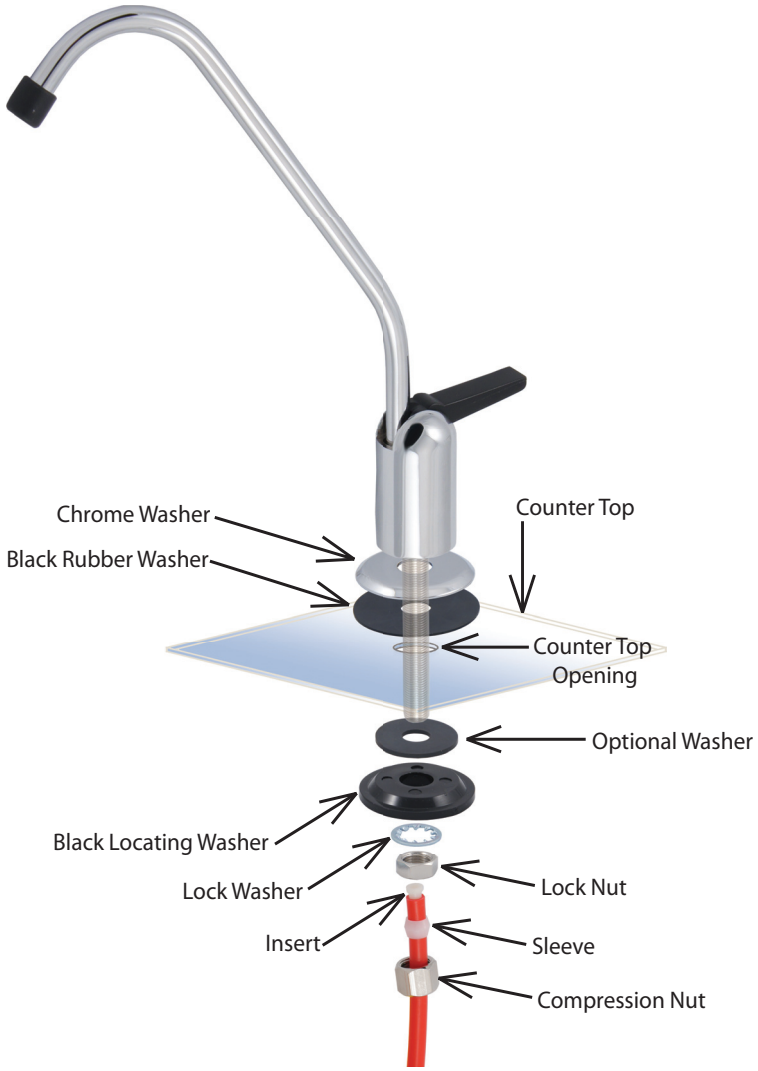
3. ***For Porcelain Sink:*** Porcelain enameled sinks can readily be chipped if care is not exercised when drilling the hole. Before starting the drill motor, apply firm downward pressure on the bit until a crunching occurs. This will help keep the drill bit from walking when starting the hole. A small pilot hole will also aid the drill bit.

   Note: Immediately after the hole drilling is done, clean up all metal chips, for **metal chips will stain the porcelain!!**

Step 4: Mounting The Faucet

1. Mount the faucet as shown in **Fig. 9**.

Fig. 9



2. Connect the **Clear** line to the faucet.

3. The faucet has two operating positions: Push black lever down to fill a glass of water, or lift lever up into a locked position to fill a container or to drain the storage tank.

Step 5: Positioning The System

1. **Main System:** The main system can stand in the sink cabinet. No need to mount the system to the wall.

2. **Tank:** The storage tank can also lay on its side if needed. The tank works fine in this position. If the tank cannot fit under the kitchen sink, it can be placed elsewhere up to 20 feet away from the RO system without much pressure loss.

Step 6: Connecting The System

Fitting Types: <u>There are 3 types of fittings provided for connecting the system</u>

1. Metal compression nut fitting (comes with 1 insert, 1 sleeve, 1 nut)

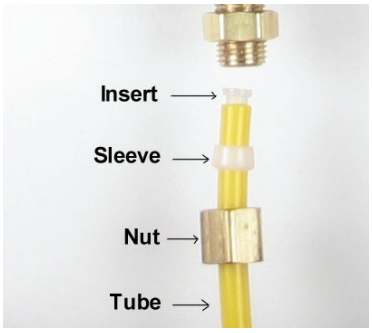


Fig. 10

Important! Use <u>plastic sleeve</u> on the plastic tubing we provide. <u>Do Not</u> use metal sleeve on plastic tubing or the connection will leak!

How to connect:
- See **Fig. 10.** Slide the compression nut onto the tubing.
- Slide the **plastic sleeve** onto the tubing.
- Insert the **"insert"** into the tubing.
- Insert the tubing into the opening of the fitting.
- Slide the brass nut up, then tighten nut with a wrench. No Teflon tape!
  (An extra metal sleeve is provided in case you need to connect your own metal tubing. Use Teflon tape if connecting metal tubing.)

2. Plastic compression nut fitting with built-in sleeve (comes with 1 insert, 1 nut)

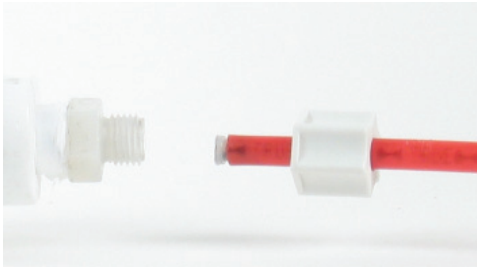


Fig. 10A

How to connect: - See **Fig. 10A.** Slide the compression nut onto the tubing.
- Insert the **"insert"** into the tubing.
- Insert the tubing into the opening of the fitting.
- Slide the nut up, then tighten nut with a wrench. No Teflon tape!

3. **Quick-Connect fitting** (no insert, sleeve, or nut)

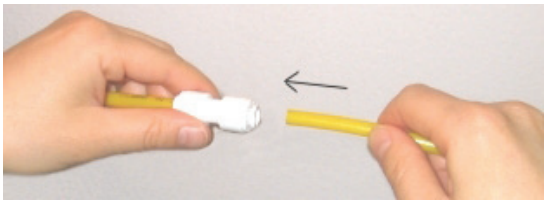


Fig. 10B

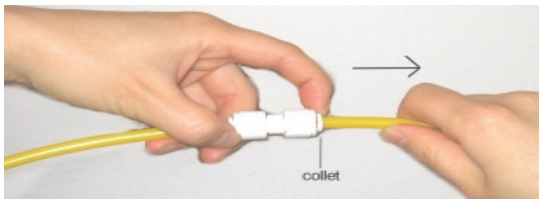


Fig. 10C

How to Connect: - See **Fig. 10B.** Simply push the tubing into the Quick-Connect fitting.
- No inserts, sleeve, or nuts are needed to secure the connection.
- No Teflon tape!

To Disconnect: - See **Fig. 10C.** Push in and hold down on the collet ring around the base of the fitting, then pull out tubing.

Summary of Tubing Connections:

There are 4 connectionsions: **See Fig 11 and 11A**

Point **A** to **X**: Connect RO to COLD water supply — **Red** tubing.

Point **G** to **Y**: Connect product water from 5th-stage filter to tank — **Yellow** tubing. This tubing is a 2-way line, Product water enters and leaves the tank via this line.

Point **H** to **Z**: Connect product water from 5th-stage output to RO faucet — **Clear** tubing.

Drain line to **W**: Connect waste water from 4th-stage membrane to drain outlet — **Black** tubing.

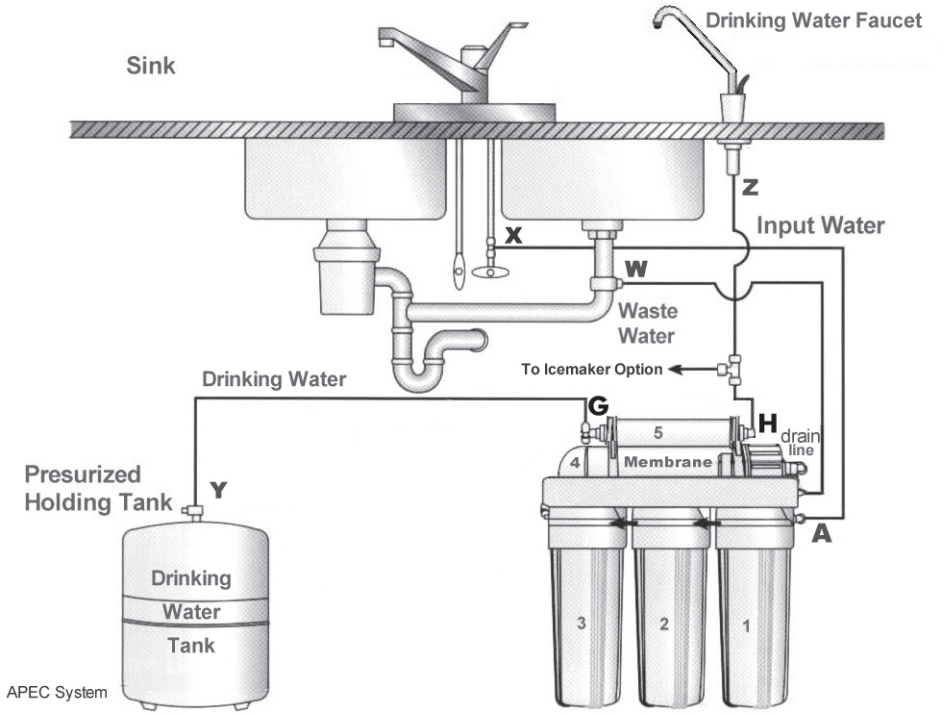


Fig. 11

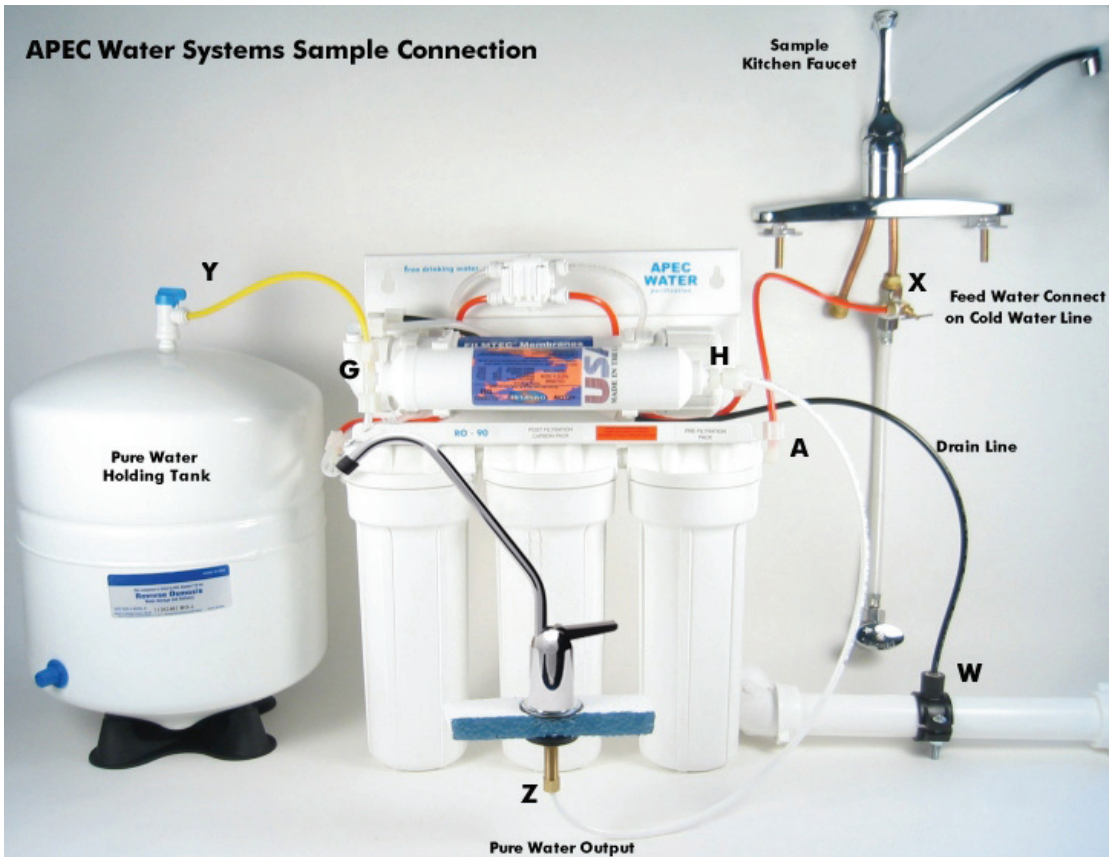


Fig. 11A

Details on Tubing Connections:

To ensure a smooth and correct installation, please connect the water lines **following the sequence and order** outlined below. Refer to **Fig. 11 & 11A** for proper point locations.

1. Point Z Faucet connection:

Tubing color: Clear tubing. Connect the CLEAR tubing to the base of the RO faucet.
Fitting type: See **Fig. 10.** Metal compression nut fitting. Use **plastic sleeve.**
Add "insert" to tubing. No teflon tape here. Tighten nut with wrench.

(DO NOT use metal sleeve on plastic tubing, will cause leakage! A metal sleeve is provided for metal tubing usage. Apply teflon if using metal tubing and sleeve.)

2. Point X Feed water connection:

Tubing color: Red tubing. Connect the RED tubing to the Feed Water Needle Valve.
Fitting type: See **Fig. 5c.** Metal compression nut fitting. Use **plastic sleeve.**
Add **"insert"** to tubing. No teflon tape here. Tighten nut with wrench.

Tips! If **points Point Z** or **Point X leaks** after you have tightened the brass nut, check to make sure you did put the plastic **"insert"** into the tubing. If the insert is already in place, then try applying Teflon tape from the threaded metal stud all the way to the plastic tubing, wrap the whole connection with 8-10 rounds of Teflon tape. Smooth out the tape on the threaded part with your fingers. Tighten brass nut again. This should stop the leak.

If the plastic sleeve is damaged, you can use the metal sleeve, but you need to apply Teflon tape as described above, this should stop the leak.

3. Point W Waste water connection:

Tubing color: Black tubing. Connect the BLACK tubing <u>from</u> the RO to the Drain Saddle.
Fitting type: Quick-Connect fitting on drain saddle. No teflon tape.
Do Not add **"insert"** into Black tubing. Simply push tubing into port.

4. Point A System water inlet (to Stage 1 prefilter) connection:

Tubing color: Red tubing. Connect the RED tubing <u>from</u> the Feed Water Valve to the RO's stage -1 prefilter.
Fitting type: Plastic compression nut fitting with built-in sleeve . No teflon tape needed here.

(Note: If stage-1 filter on your system is a **UV light**, then connect the Red tubing to the UV light inlet)

5. Point H Stage-5 filtered water to faucet connection:

Tubing color: Clear tubing. Connect the CLEAR tubing from the faucet base stud to the Stage-5 filter's *outflow* end at **point H**. (See "**Flow -->**" arrow on the filter for flow direction.)
Fitting type: Plastic compression nut fitting with built-in sleeve. No teflon tape needed here.

6. Point G Stage-5 filter's T-fitting connection:

Tubing color: Yellow tubing. Connect the YELLOW tubing to Stage-5 filter's T-fitting.
Fitting type: Plastic compression nut fitting with built-in sleeve. No teflon tape needed here.

7. Point Y Tank's input & output connection:

Prepare tank: See **Fig. 12**. Apply Teflon tape to tank's threaded Output stem on top of tank (remove rubber cap if there is one).
Screw tank Valve onto Output stem.
Tubing color: Yellow tubing. Connect the YELLOW tubing from Stage-5 T-fitting to the tank's valve.
Fitting type: Quick-Connect fitting on ball valve. Simply push Yellow tubing into valve port.

Standard 4-gallon Tank Diagram:

Fig. 12

Tank Ball Valve

OFF Position

ON Position

Option: Ice-maker Connection

If you want to connect product water from the RO to your ice-maker, you will need:

- One T-fitting, preferably the quick-connect type fitting
- Extra ¼ " tubing long enough to go from the RO system to your ice-maker
- Optional: One shut-off valve, preferably the quick-connect type.

See **Fig.11**. Before connecting the product water line from Point **Z to H**, add a T-fitting near point **H** to divert product water to both the ice-maker and the faucet.

Using RO for Ice-maker only:

If you want the RO to feed your ice-maker (fridge) only, **you should still connect the RO faucet as a 2nd outlet.** This allows you to drain the tank, flush new filters through the faucet rather than through your icemaker line. You can hang the faucet by the system and not mount it.

Option: Multiple Outputs - Add Shut Off Valve:

If your RO is feeding several output points (icemaker, fridge, bathroom), you should add a **Shut-Off valve** to each output line (except the RO spigot line). This way, if you ever need to diagnose a problem in the system, you can easily shut off these lines to isolate the water flow for accurate troubleshooting.

Step 7: System Start-Up

1. **Turn on feed water:** Slowly, turn on your Cold water supply. Open the Needle Valve (turn **counter-clockwise**) to allow the raw water to enter the system. **Check for leaks!**

2. **Open tank valve:** Open the tank's ball valve to allow water to enter the tank. The tank's valve is **"On"** when the valve handle is parallel (in the same direction) with the valve's outlet (**see Fig. 12**). **Check for leaks!**

3. **Wait for tank to fill:** Before usage, allow the tank to fill. Tank normally takes **2-3 hours** to fill. When the tank is filled, the RO will shut off automatically.

4. **Drain Tank:** **Do not use the first tank of water! Drain it out to flush the system and new filters.** Lift the faucet lever up into a locked position to drain tank. Let the tank refill again and the pure water is ready for use.

5. **Clean up area:** Allow the system to run while cleaning up tools and work area.

6. **Check for leaks!** Make sure **no leaking** at joints, fittings, valves, and tubing connections.

Congratulations! You have successfully installed the Reverse Osmosis System!

Note: **If your RO makes an annoying noise. See Troubleshoot Guide section for explanation and instructions on page 27.**

* * * End Installation Section * * *